CLAIMS

1. A strain-measuring device (10-16) including at least a deformable element (20-24) placed between at least two mounting contacts (30, 40) defining a fixation surface for being fixed on a structure (1) to be measured, prestressing means (80) of the aforementioned deformable element (20-24), measuring means (60) of the stress undergone by the aforementioned deformable element (20-24) and treatment means (70) of measurement signals, characterized in that the prestressing means (80) are extended between at least the two mounting contacts (30, 40) and are arranged for drawing together these two mounting contacts (30, 40) in translation and imposing a curvature of precise prestress to the aforementioned deformable element (20-24), these prestressing means (80) being also arranged for allowing a relative displacement in translation of these two mounting contacts (30, 40) when the aforementioned deformable element (20-24) is prestressed.

2. The device according to claim 1, characterized in that the prestressing means (80) are freely mounted at least in translation in one of the mounting contacts (30) and are tied at least in translation to the other mounting contact (40).

3. The device according to claim 2, characterized in that the prestressing means (80) includes at least a prestressing rod (81), of which at least the part (83) tied in translation to the aforementioned mounting contact (40) is threaded and cooperates with at least a nut (84) for displacing the aforementioned mounting contact (40) and at least a compensation member (85) arranged for exerting a return force between the aforementioned prestressing rod (81) and one of the mounting contacts (30).

4. The device according to claim 1, characterized in that the prestressing means (80) are tied at least in translation to the two mounting contacts (30, 40).

5. The device according to claim 4, characterized in that the prestressing means (80) includes at least a prestressing rod, of which at least the parts tied in translation to the aforementioned mounting contacts (30, 40) are threaded in an opposite direction, at least two nuts arranged for receiving the aforementioned threaded parts from the

prestressing rod and at least a compensation member arranged for exerting a return force between the aforementioned mounting contacts (30, 40).

6. The device according to claim 3 or 5, characterized in that the aforementioned nut (84) is integrated with or coupled to the aforementioned corresponding mounting contact (40).

7. The device according to claim 3 or 5, characterized in that the aforementioned nut (84) is made from a tapped boring (42) provided in the aforementioned mounting contact (30, 40).

8. The device according to claim 3 or 5, characterized in that the prestressing means (80) comprise at least a supplemental nut (86) coupled to the end of the threaded part of the aforementioned prestressing rod (81) and forming a locking counter nut.

9. The device according to claim 3 or 5, characterized in that the prestressing rod (81) is chosen from the group comprising at least screws, bolts, and pins.

10. The device according to claim 3 or 5, characterized in that the compensation member (85) is chosen from the group comprising at least springs, elastic washers, wedges of elastomer, and leaf springs.

11. The device according to claim 3 or 5, characterized in that it comprises a single deformable element (20,21, 22) arranged between two identical mounting contacts (30, 40) approximately parallel to the fixation surface of these contacts and arranged for deforming itself in a plane approximately perpendicular to this surface.

12. The device according to claim 11, characterized in that the prestressing means (80) comprise two prestressing rods (81) arranged parallely and symmetrically with respect to the median plane passing through the aforementioned deformable element (20,21).

13. The device according to claim 11, characterized in that the prestressing means (80) comprise a prestressing rod (81) and a guiding rod arranged parallely and symmetrically with respect to the median plane passing through the aforementioned deformable element (20,21).

14. The device according to claim 11, characterized in that the prestressing means (80) comprise a prestressing rod (81) arranged in the median plane passing through the aforementioned deformable element (22).

15. The device according to claim 14, characterized in that the aforementioned deformable element (22) includes a central hollow (22') of traverse dimensions superior to those of the aforementioned prestressing rod (81).

16. The device according to claim 3 or 5, characterized in that it comprises two deformable elements (23,24) arranged between two identical mounting contacts (30, 40) symmetrically with respect to a median plane of the aforementioned device, approximately perpendicular to the fixation surface of these contacts and arranged for deforming themselves in a plane approximately parallel to this surface.

17. The device according to claim 16, characterized in that the prestressing means (80) comprise a prestressing rod (81) arranged in the aforementioned median plane.

18. The device according to claim 11 or 16, characterized in that it comprises at least two distinct mounting contacts (30) and a common mounting contact (40).

19. The device according to claim 18, characterized in that it comprises at least a deformable element (20-24) extending between the aforementioned common mounting contact (40) and each distinct mounting contact (30), the aforementioned deformable elements (20-24) being angularly shifted from an angle α.

20. The device according to claim 19, characterized in that the angle α is equal to a value chosen from the group comprising at least 30°, 45°, 60°, 90°, and 120°.

21. The device according to claim 18, in that it includes three distinct mounting contacts (30) and a common mounting contact (40), at least a deformable element extending between each pair of distinct mounting contacts (30), the aforementioned deformable elements being arranged approximately in a triangle.

22. The device according to claim 11 or 16, characterized in that the aforementioned deformable element (20-24) is made of an elastic strip of a material chosen from the

group comprising at least stainless steel with or without structural hardening, titanium alloys, and copper alloys with beryllium.

23. The device according to claim 18, 19 or 21, characterized in that the aforementioned deformable element (24) and the aforementioned mounting contacts (30, 40) are formed from a single piece in a material of which the coefficient of dilatation is close to that of the structure to be measured, this material being chosen from the group comprising at least stainless steel with or without structural hardening, titanium alloys, copper alloys with beryllium, and aluminum alloys having a high elastic limit.

24. The device according to claim 23, characterized in that the aforementioned deformable element (24) is manufactured or cut in a manner to give it an initial curvature in a direction of its prestress curvature.

25. The device according to claim 1, characterized in that the aforementioned deformable element (20-23) is mounted by at least one of its ends in one of the mounting contacts (30, 40) by at least a technique chosen from the group comprising at least fitting, interlocking, screwing, riveting, gluing, and welding.

26. The device according to claim 25, characterized in that the aforementioned mounting contact (30, 40) comprises a mounting zone (31, 41) for receiving an end of the deformable element (20-23), this mounting zone being inclined with respect to the fixation surface of the aforementioned mounting contact (30, 40) in a manner to give to the aforementioned deformable element (20-23) an initial curvature in a direction of its prestress curvature.

27. The device according to claim 1, characterized in that the aforementioned mounting contacts (30, 40) are for fixing on the aforementioned structure (1) to be measured by at least a technique chosen from the group comprising at least screwing, riveting, gluing, and welding.

28. The device according to claim 1, characterized in that the measuring means (60) of the stress undergone by the aforementioned deformable element (20-24) are

chosen from the group comprising at least resistive stress gauges (61,62), piezo-electric sensors, contactless proximity sensors, and vibration sensors.

29. The device according to claim 28, characterized in that the aforementioned stress gauges (61,62) are four in number and mounted as a Wheatstone bridge.

30. The device according to claim 1, characterized in that it comprises a protective housing (90) at least partially covering the aforementioned mounting contacts (30, 40) and the aforementioned deformable element(s) (20-24).

31. The device according to claim 27, characterized in that the aforementioned protective housing is waterproofed.

32. The device according to claim 27, characterized in that the treatment means (70) of the signals comprises at least an electronic conditioning circuit, this circuit being integrated with or coupled to the aforementioned housing (90), or displaced and linked to the aforementioned housing by means of communication.

33. The device according to claim 1, characterized in that the aforementioned treatment means (70) of signals are arranged for measuring the internal temperature of the aforementioned device and correcting the values of the aforementioned signals as a function of this temperature.